

A.2.25 AOC 6A

Description

This AOC consists of oily and tarry materials identified in several soil borings during the installation of an expanded groundwater monitoring system at the Refinery in 1991. AOC 6 has been broken down into three separate areas that appear to represent potentially separate sources. The original AOC 6 consisted of borings distributed throughout several areas of the Refinery that do not represent a single source area. AOC 6A consists of Boring B-26¹ and B-34, which are both located in the North Field between Tanks 326 and 328. Figure A.2.21 shows the approximate locations of borings installed in the vicinity of AOC 6A.

As shown on Figure A.2.21 and summarized on Table A.2.21, three borings and seven soil samples have been used to characterize this AOC. Relevant data from other AOCs and PAOCs located near AOC 6A have also been included in Table A.2.21 for delineation purposes.

Soils

During the 1st-Phase Soils Investigation, one boring (SB0172) was installed to provide additional characterization of this AOC. Two additional borings (S0810 and S0811) were installed in September 2002 during the full RFI at the approximate locations shown on Figure A.2.21. Boring S0810 was installed in the No. 4 Oil Water Separator Feeder Ditch to determine if AOC 6A is associated with SWMU 35. A surficial sample (0.5 to 2 feet bgs), a fill material sample (2 to 2.5 and 7.5 to 8 feet bgs from borings S0810 and S0811 respectively), and a sample from the underlying peat and clay materials (11.5 to 12 feet and 14.5 to 15 ft bgs from borings S0810 and S0811 respectively) were collected from each boring. These six soil samples were analyzed for VOCs, SVOCs and metals. One sample was also analyzed for SPLP metals and physical characteristics.²

The following table summarizes the number of samples where the soil delineation criteria were exceeded within AOC 6A:

¹Note that there is no record of Boring B-26 in the DRAI reports, except in the November 1, 1991 Notification Letter. The November 15, 1991 Summary of Soil Boring Results (borings B-20 through B-24) does reference boring B-25, which is located in the immediate vicinity of B-26. Therefore the boring data from B-25 is listed in the summary table.

²Physical characteristics specified in Appendix A, Task IV of Module III of the HWSA Permit included saturated and unsaturated permeability tests, moisture content, relative permeability, bulk density, porosity, soil sorptive capacity, CEC, TOC, pH, Eh and grain size distribution.

Constituents of Concern	Surface Soils (0 to 2 ft)	Fill Material (>2 ft)	Native Soils	Totals
Benzene	0/2	1/2	0/2	1/6
Other VOCs	0/2	0/2	0/2	0/6
Benzo(a)pyrene	1/2	2/2	0/2	3/6
Other SVOCs	1/2	2/2	0/2	3/6
Lead	1/2	0/2	0/2	1/6
Arsenic	0/2	2/2	0/2	2/6
Other TAL Metals ^a	0/2	0/2	0/2	0/6

^aTotals do not include naturally-occurring metal compounds in excess of the delineation criteria (Al, Ca, Fe, Mg, Mn, K and Na).

Surface Soils (0 to 2 feet bgs)

Trace amounts of catalyst beads and some black staining were observed in surface soils at two borings (S0811 and SB0172). The surficial sample (S0811A4) from boring S0811 contained lead (515 mg/kg), benzo(a)pyrene (1.4J mg/kg), and two other PAHs slightly above the soil delineation criteria. Naturally-occurring iron was the only compound detected above the delineation criteria in the other surface soil sample (S0810A4).

Fill Materials (>2 feet bgs)

Evidence of petroleum-related impacts (black staining, odors, elevated PID readings, etc.) were noted in subsurface fill materials at AOC 6A. Catalyst beads and slag were also noted in several of the borings. The fill material ranges in thickness from approximately 9.5 to greater than 16 fddt in this area of the Refinery.

One soil sample was collected from the six to eight foot interval from SB0172 and analyzed for TPH (fingerprint) in 1995. Analytical results indicated that the material present in the soil is evaporated/weathered crude oil. This is consistent with the known waste streams discharged through the feeder ditch and ponded area into the No. 4 Oil Water Separator (SWMU #35), located immediately northeast of AOC 6A.

The subsurface fill sample (S0810B1) from boring S0810 contained several constituents at concentrations above the delineation criteria, including benzene (2.2 mg/kg), benzo(a)pyrene (5.9 mg/kg), several other PAHs, and arsenic (35.1 mg/kg). The other subsurface fill sample (S0811D4) also contained several PAHs including benzo(a)pyrene (9.5 mg/kg), and arsenic (45.5 mg/kg) in excess of the soil delineation criteria. Arsenic concentrations, which range between 35.1 mg/kg to 45.5 mg/kg, are within the normal range for soils, particularly glauconitic soils in the Coastal Plain (Saunders, 2003).

Native Soils

A peat clay layer underlies the fill material at depths ranging from 9.5 to at least 16 feet bgs. The two deep samples (S0810F4 and S0811H2) collected from the native material underlying the fill material contained only naturally-occurring iron at concentrations

exceeding the soil delineation criteria. Therefore, the site-related soil impacts have been delineated vertically.

As discussed further in Section 6 of the RFI Report, lateral delineation of selected COCs has been completed on a site-wide basis for each Yard. The delineation of these COCs is depicted graphically on the figures provided in Section 6.

Groundwater

Two hydropunch samples were collected in the vicinity of AOC 6A as part of the Phase II OWSS Investigation. One of these samples (H0417) contained arsenic (8.16 µg/L) and lead (44.61 µg/L), and the other sample (H0418) contained benzene (23 µg/L) and lead (48 µg/L) above the applicable groundwater delineation criteria. However, these samples were collected using the traditional hydropunch with porous media methodology; therefore, the detected metals concentrations are not considered to be representative of ambient groundwater conditions. Further discussion of potential groundwater impacts in the vicinity of AOC 6A can be found in Section 8 of the RFI report.

Summary

In summary, benzene, several PAHs including benzo(a)pyrene, and several metals (arsenic and lead) were detected above the delineation criteria within this AOC. Arsenic concentrations, which range between 35.1 mg/kg to 45.5 mg/kg, are within the normal range for soils, particularly glauconitic soils in the Coastal Plain (Saunders, 2003).

Historic oily process storm water discharged into the No. 4 Separator (SWMU 35) appears to be the source of soil impacts to this AOC. Therefore, Chevron recommends that this area be combined with SWMU 35 for further evaluation in the CMS, and that AOC 6A be eliminated from the HSWA Permit.